

DEC-03-04 13:52 From:

**PORTER  
WRIGHT  
MORRIS &  
ARTHUR LLP**  
Attorneys and  
Counselors at Law

10/516806  
12 Rec'd PCT/PTO 15 MAY 2004  
T-681 P.01 Job-138

41 South High Street  
Columbus, Ohio 43215-6194  
Main Telephone #: (614) 227-2000  
Main Facsimile #: (614) 227-2100

## Facsimile Cover Sheet

SENDER'S FACSIMILE RECEIVING #: (614) 227-2100

IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR OR IF YOU HAVE ANY PROBLEMS  
RECEIVING THIS COMMUNICATION, PLEASE CALL (614) 227-2197 IMMEDIATELY. THANK YOU.

THE INFORMATION CONTAINED IN THIS COMMUNICATION IS CONFIDENTIAL AND SUBJECT TO ATTORNEY-CLIENT, WORK  
PRODUCT, OR OTHER LEGAL PRIVILEGE. THIS COMMUNICATION IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY  
NAMED AS RECIPIENT. IF THE READER OF THIS COMMUNICATION IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED  
THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED.

Date: December 3, 2004 User: 1154 Client Matter #: 3998264-151581

TOTAL NUMBER OF PAGES INCLUDING COVER SHEET: 53

### PLEASE DELIVER TO:

Name: Terry Johnson-Vessels  
Firm: Patent and Trademark Office City: \_\_\_\_\_  
Facsimile #: 1-703-746-6630 Confirmation #: \_\_\_\_\_

RE: PCT/EP02/14873 and PCT/EP02/12619

Dear Terry:

Per our conversation of earlier this morning, attached please find the documents filed for the  
above-referenced applications. I look forward to talking with you next week concerning the serial  
numbers for these applications. Thank you for all your help.

From: Belinda L. Reynolds Phone No. (614) 227-2080

THE ORIGINAL OF THIS DOCUMENT WILL BE SENT BY:

☐

ORDINARY MAIL  
MESSENGER

☒

OVERNIGHT DELIVERY SERVICE  
THIS WILL BE THE ONLY FORM OF DELIVERY

Cincinnati • Cleveland • Columbus • Dayton • Naples, FL • Washington, DC

DT12 Rec'd

10/516806

The stamp of the Patent and Trademark Office hereon will acknowledge receipt on the date stamped of a Preliminary Amendment, Information Disclosure Statement with 3 references, Copy of International Search Report, Copy of published PCT Application WO 03/041570 A2, Deposit Account Authorization (in duplicate), and Certificate of Filing by Express Mail in connection with the following national stage application:

Inventor: Roger McMorrow  
Int'l App: PCT/EP02/12619  
Title: A LARYNGO SCOPE

These papers were mailed by U.S. Express Mail, receipt No. EV403237228US, on this 13<sup>th</sup> day of May, 2004.

DT02 Rec'd PCT/PTO 1 3 MAY 2004

Rec

**PORTER WRIGHT MORRIS & ARTHUR LLP**  
Attorneys & Counselors at Law

Richard M. Mescher  
614-227-2026  
rmescher@porterwright.com

41 South High Street  
Columbus, Ohio 43215-6194

Facsimile: 614-227-2100  
Toll Free: 800-533-2794

May 13, 2004

**VIA EXPRESS MAIL RECEIPT NO. EV403237228US**

Box PCT  
U.S. Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

Re: First Inventor: Roger McMorrow  
Int'l App. No.: PCT/EP02/12619  
Filing Date: November 12, 2002  
Title: A LARYNGO SCOPE

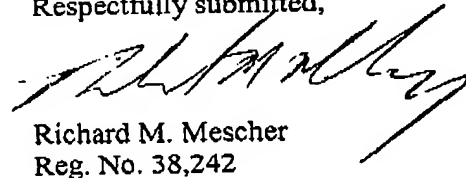
Dear Sir:

Enclosed for filing, pursuant to U.S.C. 371, in connection with the above-identified international patent application are the following:

1. Preliminary Amendment;
2. Information Disclosure Statement with 3 references;
3. Copy of International Search Report including copies of references cited therein;
4. Copy of published PCT Application WO 03/04150 A2;
5. Deposit Account Authorization (in duplicate); and
6. Certificate of filing by Express Mail.

The applicant claims small entity status. Also enclosed is a postcard receipt which we ask that you acknowledge and return to us.

Respectfully submitted,

  
Richard M. Mescher  
Reg. No. 38,242

Enclosures

Cincinnati • Cleveland • Columbus • Dayton • Naples, FL • Washington, DC  
www.porterwright.com

COLUMBUS/1146685 v.01

**BEST AVAILABLE COPY**

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor: Roger McMorrow  
Serial No.: tbd  
Int'l. App. No.: PCT/EP02/12619  
Int'l Filing Date: 11/12/02  
Title: "LARYNGOSCOPE"  
Attorney Docket No.: 3998264-151581

**PRELIMINARY AMENDMENT**

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This Preliminary Amendment filed in connection with entry of the nation stage in the United States for the above identified PCT patent application.

Please amend the above-identified application in the following manner prior to calculation of claim fees and prior to examination thereof.

**IN THE CLAIMS:**

Please amend the claims as shown in the Listing of Claims.

**Listing of claims**

1. **(original)** A laryngoscope comprising a blade; a deployable mirror, the mirror being pivotable with respect to the blade; and an operating mechanism, the operating mechanism being operatively associated with the mirror for deployment thereof, wherein the operating mechanism is spring biased to adopt a rest state, the association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism from said rest state against said spring bias causes the mirror to be deployed, and further operation of the operating mechanism from said rest state against said spring bias causes the mirror to be pivoted with respect to the blade.

2. **(original)** A laryngoscope as claimed in claim 1, wherein the mirror is pivotably mounted on a deployment assembly, the deployment assembly being pivotably mounted on the blade, the arrangement being such that said initial operation of the operating mechanism causes the deployment assembly to be pivoted with respect to the blade, and said further operation of the operating mechanism causes the mirror to be pivoted with respect to the deployment assembly.

3. **(original)** A laryngoscope as claimed in claim 2, wherein the deployment assembly comprises a deployment arm coupled to a secondary arm so as to permit relative movement between the deployment arm and secondary arm, the mirror being coupled to both the deployment arm and the secondary arm so that relative movement thereof causes the mirror to pivot.

4. **(original)** A laryngoscope as claimed in claim 3, wherein the coupling of the deployment arm and the secondary arm includes a spring assembly biased to maintain the deployment arm and the secondary arm in a first position relative to one another, the arrangement being such that, during said initial operation of the operating mechanism, the spring assembly maintains the deployment arm and the secondary arm in the first position, and that,

during said further operation of the operating mechanism, a portion of the deployment arm abuts against the blade so that the action of the operating mechanism on the deployment assembly overcomes the bias of the spring mechanism to cause relative movement of the deployment arm and the secondary arm.

5. **(original)** A laryngoscope as claimed in claim 4, wherein said spring assembly comprises a pin slidably located within a slot, and a spring arranged to act on the pin to maintain the pin in the first position within the slot.

6. **(original)** A laryngoscope as claimed in claim 5, wherein the slot is formed in the deployment arm and the pin is provided on the secondary arm.

7. **(currently amended)** A laryngoscope as claimed in ~~any preceding~~ claim 1, wherein the operating mechanism comprises a lever, the lever being pivotable with respect to the blade.

8. **(original)** A laryngoscope as claimed in claim 7, wherein the lever is connected to the secondary arm by a tie.

9. **(currently amended)** A laryngoscope as claimed in ~~any of claims 3 to 8~~ claim 3, wherein the mirror is provided with a mounting bracket, the mounting bracket being pivotably mounted on the deployment arm, the secondary arm being pivotably connected to the mounting bracket eccentrically of the connection between the mounting bracket and the deployment arm.

10. **(currently amended)** A laryngoscope as claimed in ~~any preceding~~ claim 1, wherein the blade is curved.

11. **currently amended)** A laryngoscope as claimed in ~~any preceding~~ claim 1, wherein the blade extends, during use, substantially perpendicularly from the handle.

12. **(original)** A laryngoscope as claimed in claim 11, wherein the blade is detachably mounted on the handle.

13. (currently amended) A laryngoscope as claimed in claim 11 ~~or 12 when dependent on any of claims 7 to 9~~, wherein the operating mechanism comprises a lever, the lever being pivotable with respect to the blade, wherein the lever is spring biased in a direction generally away from the handle and wherein said initial and further operation of the lever involve movement of the lever in a direction generally towards the handle.

14. (currently amended) A laryngoscope as claimed in ~~any preceding claim 1~~, wherein the mirror is actuatable between a non-deployed state, in which the mirror is located against or adjacent the blade, and at least one deployed state in which the mirror is spaced-apart from the blade with its reflective surface facing generally towards the blade.

15. (currently amended) A laryngoscope as claimed in claim 14, ~~when dependent on claim 13~~, wherein the operating mechanism comprises a lever, the lever being pivotable with respect to the blade, wherein the lever is spring biased in a direction generally away from the handle, wherein said initial and further operation of the lever involve movement of the lever in a direction generally towards the handle, and wherein the lever is arranged to adopt a rest state in the absence of external forces, in which rest state the lever is spaced-apart from the handle, the arrangement being such that, when the lever adopts the rest state, the mirror adopts the non-deployed state, initial movement of the lever from the rest state towards the handle causing the mirror to be deployed, and further movement of the lever towards the handle causes the mirror to be pivoted.

16. (currently amended) A laryngoscope as claimed in claim 14 ~~or 15~~, wherein a recess is formed in the blade for receiving the mirror when in the non-deployed state.

17. (currently amended) A laryngoscope as claimed in ~~any preceding claim 1~~, wherein the blade comprises a pivotable tip, the operating mechanism being operatively associated with the tip to cause the tip to pivot with respect to the blade.

18. (original) A laryngoscope as claimed in claim 17, wherein the operating mechanism is arranged to cause the tip to pivot during said initial operation.

19. (currently amended) A laryngoscope as claimed in claim 17 ~~or 18~~, wherein the operating mechanism is arranged to cause the tip to pivot during said further operation.

20. (currently amended) A laryngoscope as claimed in ~~any of claims 17 to 19 when dependent on claim 11~~ claim 17, wherein the blade extends, during use, substantially perpendicularly from the handle, and wherein during said initial or further operation of the operating mechanism, the tip is caused to pivot in a direction generally towards the handle.

21. (currently amended) A laryngoscope as claimed in ~~any preceding~~ claim 1, wherein the blade carries a light source arranged to irradiate the mirror when deployed.

22. (currently amended) A blade for a laryngoscope, the blade comprising a deployable mirror, the mirror being pivotable with respect to the blade; and an operating mechanism, the operating mechanism being operatively associated with the mirror for the deployment thereof, wherein ~~the mirror is pivotable with respect to the blade~~ operating mechanism is spring biased to adopt a rest state, the association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism from said rest state against said spring bias causes the mirror to be deployed, and further operation of the operating mechanism from said rest state against said spring bias causes the mirror to be pivoted with respect to the blade.



**REMARKS**

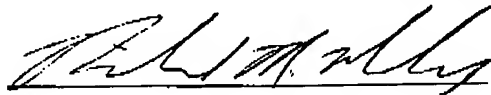
This Preliminary Amendment cancels no claims, amends claims 7, 9 to 11, 13 to 17, and 19 to 22, and adds no new claims. Accordingly, claims 1 to 22 are remain pending in this application.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is found that that the present amendment does not place the application in a condition for allowance, applicant's undersigned attorney requests that the examiner initiate a telephone interview to expedite prosecution of the application.

If there are any fees resulting from this communication, please charge same to our Deposit Account No. 16-2326.

Respectfully submitted,

PORTER, WRIGHT, MORRIS & ARTHUR LLP



Richard M. Mescher, Reg. No. 38,242

Porter, Wright, Morris & Arthur  
41 South High Street  
Columbus, OH 43215-6194

May 13, 2004

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Inventor: Roger McMorrow  
Title: A LARYNGO SCOPE  
Int'l App. No.: PCT/EP02/12619

Box PCT  
U.S. Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

**AUTHORIZATION RE DEPOSIT ACCOUNT**

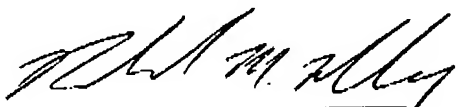
Dear Sir:

Please charge any deficiency in the fees for the above-referenced application to our Deposit Account No. 16-2326.

A duplicate copy of this paper is provided.

Respectfully submitted,

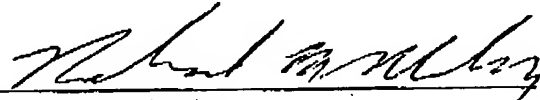
Dated: May 12, 2004

By:   
Richard M. Mescher  
Porter, Wright, Morris & Arthur, LLP  
41 South High Street  
Columbus, OH 43215  
(614) 227-2026

~~112 Rec'd PCT/PTO 15 MAY 2004~~

**CERTIFICATE OF FILING BY EXPRESS MAIL**

This is to certify that this Preliminary Amendment, Information Disclosure Statement with 3 references, Copy of International Search Report including copies of references, Copy of published PCT Application WO 03/041570 A2, and Deposit Account Authorization (in duplicate), were mailed by U.S. Express Mail, receipt No. EV403237228US to Box PCT, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450, this 13<sup>th</sup> day of May, 2004.



Richard M. Mescher  
Porter, Wright, Morris & Arthur LLP  
41 South High Street  
Columbus, Ohio 43215  
(614) 227-2026

PCT National Stage Application  
Int'l App. No.: PCT/EP02/12619

OT12 Rec'd

The stamp of the Patent and Trademark Office hereon will acknowledge receipt on the date stamped of a Preliminary Amendment, Information Disclosure Statement with 3 references, Copy of International Search Report, Copy of published PCT Application WO 03/041570 A2, Deposit Account Authorization (in duplicate), and Certificate of Filing by Express Mail in connection with the following national stage application:

Inventor: Roger McMorrow  
Int'l App: PCT/EP02/12619  
Title: A LARYNGO SCOPE

These papers were mailed by U.S. Express Mail, receipt No. EV403237228US, on this 13<sup>th</sup> day of May, 2004.

10/516806

~~12 Rec'd PCT/TO 15 MAY 2004~~

Sheet 1 of 1

FORM PTO-1449 (Rev. 8-83)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 3998264-151581	Serial No. To be assigned			
INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)		Applicant: Roger McMorrow				
		Filing Date: May, 13, 2004		Group Art Unit: To be assigned		
U.S. PATENT DOCUMENTS						
Examiner Initial	Document Number	Date	Inventor	Class	Subclass	Filing Date If Appropriate
	6,135,948	10/24/2000	Lee			
	4,360,008	11/23/82	Corazzelli			
U.S. PATENT DOCUMENTS						
Examiner Initial	Document Number	Date	Inventor	Class	Subclass	Filing Date If Appropriate
FOREIGN PATENT DOCUMENTS						
	Document Number	Date	Country	Class	Subclass	Translation Yes No
	2,258,398	10/2/93	Great Britain			No
						No
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)						
Examiner						Date Considered

\*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

(43) International Publication Date  
22 May 2003 (22.05.2003)

PCT

(10) International Publication Number  
WO 03/041570 A2

(51) International Patent Classification<sup>7</sup>: A61B 1/267  
(21) International Application Number: PCT/EP02/12619  
(22) International Filing Date:  
12 November 2002 (12.11.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 0127130.3 13 November 2001 (13.11.2001) GB  
13 May 04

(71) Applicant and

(72) Inventor: McMorrow, Roger (GB/GB); 148 Finaghy Road South, Belfast BT10 ODG (GB).

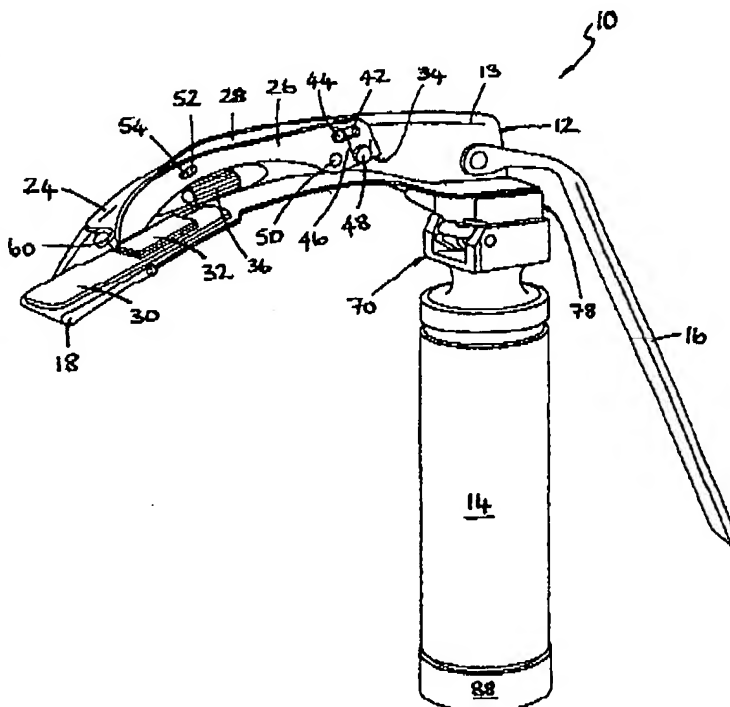
(74) Agents: WALLACE, Alan et al.; F R Kelly &amp; Co, 9 University Street, Belfast BT7 1FY (GB).

(81) Designated States (national): AB, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, FR, GB, GR, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: A LARYNGOSCOPE



(57) Abstract: One aspect of the present invention provides a laryngoscope comprising a blade; a deployable mirror; and an operating mechanism, the operating mechanism being arranged to deploy the mirror. The mirror is pivotable with respect to the blade and the arrangement is such that an initial operation of the operating mechanism causes the mirror to be deployed while further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade. In the preferred embodiment, the blade has a pivotable tip which is also operable by the operating mechanism. The deployment of the mirror, the pivoting of the mirror 30 and the pivoting of the tip 18 can all be performed by operation of a single operating mechanism, preferably in the form of a simple lever. The laryngoscope may therefore readily be operated using only one hand and without the need for any dextrous finger movements.

WO 03/041570 A2

**WO 03/041570 A2**



**Published:**

— without international search report and to be republished  
upon receipt of that report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

WO 03/041570

5/10/17

10/516806  
Rec'd PCT/PTO 13 MAY 2004  
JT12 Rec'd PCT/PTO 15 MAY 2004

PCT/EP02/12619

A LARYNGOSCOPE

## FIELD OF THE INVENTION

The present invention relates to a laryngoscope, and in particular a laryngoscope which includes a deployable mirror.

## BACKGROUND TO THE INVENTION

Intubation is a common requirement for anaesthesia, and a laryngoscope is a commonly used instrument for visualizing the larynx to allow the introduction of an endotracheal (ET) tube. The view obtained at laryngoscopy is normally graded on a 1-4 scale, depending on to what extent the view is obscured. Grades 1 and 2 usually provide little difficulty with intubation. However a grade 3 larynx can present considerable difficulty, often requiring special techniques such as blind insertion of the ET tube. A grade 4 larynx is often impossible to intubate using a standard laryngoscope and normally requires the use of more specialized equipment such as fiberoptic equipment. There are four main anatomical factors that contribute to confound the view of the larynx, namely, forward displacement of the larynx, forward or prominent upper teeth, backward displacement of the tongue and poor mouth opening. Another major factor that contributes to confound the view is the inability to achieve what is commonly known as the Magill position of neck flexion and head extension due to either cervical spine instability or pathological



WO 03/041570

PCT/EP02/12619

2

disease such as rheumatoid conditions or ankylosing spondylitis.

- In its basic form, a laryngoscope includes a handle with a slightly curved or straight plate, commonly known as a blade, extending substantially perpendicularly from the handle. The Macintosh laryngoscope, which normally has a slightly curved blade, is an example of such a laryngoscope. In use, the blade is inserted into the patient's mouth until its tip is located at the base of the patient's tongue. Normally the tip of the blade is positioned between the base of the person's tongue and the epiglottis such that, by lifting the laryngoscope anteriorly, the tongue and epiglottis are moved allowing a clearer view of the trachea. A user will generally look for the larynx (vocal cords) which gives an exact indication of the position in which to place the breathing tube.
- The use of a curved Macintosh blade laryngoscope in the context of a Grade 3 or 4 larynx may necessitate a forward and upward levering movement. In such situations the patient's teeth may inadvertently be used as a fulcrum and persistent attempts to elevate the epiglottis frequently results in damage to the upper teeth. In an attempt to overcome this problem, a levering laryngoscope, commonly known as the McCoy laryngoscope, was created. The McCoy laryngoscope has a pivotable tip at the end of the blade, the tip being operable by a lever on the handle of the laryngoscope. When the handle is depressed, the tip pivots to pull the epiglottis away from the mouth of the larynx. The McCoy laryngoscope helps to improve the view of the

WO 03/041570

PCT/EP02/12619

3

larynx and, because the fulcrum point is at the distal end of the blade, decreases the likelihood of the patient's teeth being damaged.

5 It is also known to provide the blade with a deployable mirror which, during use, allows the user to view the larynx more clearly. US Patent No. 6,135,948 (Lee) describes an example of such a laryngoscope. However, the Lee Laryngoscope is considered to be awkward to  
10 use.

Despite the devices described above, intubation remains difficult in many cases. It would be desirable, therefore, to provide an improved laryngoscope,  
15 particularly since prolonged attempts at laryngoscopy often result in injury, most commonly vocal cord haematoma and mucosal lacerations.

#### SUMMARY OF THE INVENTION

20

A first aspect of the present invention provides a laryngoscope comprising a blade; a deployable mirror; and an operating mechanism, the operating mechanism being operatively associated with the mirror for the  
25 deployment thereof, wherein the mirror is pivotable with respect to the blade, the association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism causes the mirror to be deployed, and further operation of the  
30 operating mechanism causes the mirror to be pivoted with respect to the blade.

WO 03/041570

PCT/EP02/12619

4

Preferably, the mirror is pivotably mounted on a deployment assembly, the deployment assembly being pivotably mounted on the blade, the arrangement being such that said initial operation of the operating mechanism causes the deployment assembly to be pivoted with respect to the blade, and said further operation of the operating mechanism causes the mirror to be pivoted with respect to the deployment assembly.

More preferably, the deployment assembly comprises a deployment arm coupled to a secondary arm so as to permit relative movement between the deployment arm and secondary arm, the mirror being coupled to both the deployment arm and the secondary arm so that relative movement thereof causes the mirror to pivot.

Further preferably, the coupling of the deployment arm and the secondary arm includes a spring assembly biased to maintain the deployment arm and the secondary arm in a first position relative to one another, the arrangement being such that, during said initial operation of the operating mechanism, the spring assembly maintains the deployment arm and the secondary arm in the first position, and that, during said further operation of the operating mechanism, a portion of the deployment arm abuts against the blade so that the action of the operating mechanism on the deployment assembly overcomes the bias of the spring mechanism to cause relative movement of the deployment arm and the secondary arm.

Preferably, the spring assembly comprises a pin slidably located within a slot, and a spring arranged

WO 03/041570

PCT/EP02/12619

5

to act on the pin to maintain the pin in the first position within the slot.

Preferably, the operating mechanism comprises a lever,  
5 the lever being pivotable with respect to the blade.

Preferably, the blade extends, during use, substantially perpendicularly from a handle. More preferably, the blade is detachably mountable on the  
10 handle.

In the preferred embodiment, the lever is spring biased in a direction generally away from the handle and wherein said initial and further operation of the lever  
15 involve movement of the lever in a direction generally towards the handle.

Preferably, the mirror is actuatable between a non-deployed state, in which the mirror is located against  
20 or adjacent the blade, and at least one deployed state in which the mirror is spaced-apart from the blade with its reflective surface facing generally towards the blade. More preferably, the lever is arranged to adopt a rest state in the absence of external forces, in  
25 which rest state the lever is spaced-apart from the handle, the arrangement being such that, when the lever adopts the rest state, the mirror adopts the non-deployed state, initial movement of the lever from the rest state towards the handle causing the mirror to be  
30 deployed, and further movement of the lever towards the handle causes the mirror to be pivoted.

WO 03/041570

PCT/EP02/12619

6.

In the preferred embodiment, the blade comprises a pivotable tip, the operating mechanism being operatively associated with the tip to cause the tip to pivot with respect to the blade. Preferably, the  
5 operating mechanism is arranged to cause the tip to pivot during said initial operation and said further operation.

Preferably, the blade carries a light source arranged  
10 to irradiate the mirror when deployed.

A second aspect of the invention provides a blade for a laryngoscope, the blade comprising a deployable mirror; and an operating mechanism, the operating mechanism  
15 being operatively associated with the mirror for the deployment thereof, wherein the mirror is pivotable with respect to the blade, the association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism causes the  
20 mirror to be deployed, and further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade.

Other advantageous aspects and features of the  
25 invention will become apparent to those ordinarily skilled in the art upon review of the following description of a specific embodiment of the invention and with reference to the accompanying drawings.

30

WO 03/041570

PCT/EP02/12619

7

## BRIEF DESCRIPTION OF THE DRAWINGS

A specific embodiment of the invention is now described, by way of example, and with reference to the  
5 accompanying drawings, in which:

Figure 1 is a perspective view of a preferred  
embodiment of a laryngoscope according to the present  
invention, with a mirror shown in a non-deployed state;  
10

Figure 2 is a side elevation of the laryngoscope of  
Figure 1, with the mirror shown in a deployed state;

Figure 3 is an exploded perspective view of the  
15 laryngoscope of Figure 1;

Figure 4 is a side view of the laryngoscope of Figure 1  
with the mirror in a deployed state;

20 Figure 5 is a side view of the laryngoscope of Figure  
1, similar to that shown in Figure 4, wherein the  
mirror is in a different deployed state;

Figure 6 is a perspective view of part of a handle  
25 forming part of the laryngoscope of Figure 1; and

Figure 7 shows a perspective view of part of the blade  
of the laryngoscope, in particular showing a coupling  
which permits the blade to be secured to the handle.  
30

WO 03/041570

PCT/EP02/12619

8

## DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the accompanying drawings, there is shown, generally indicated as 10, a preferred embodiment of a laryngoscope according to the invention. The laryngoscope 10 comprises a plate, or blade 12, and a handle 14. The blade 12 is mountable on the handle 14 such that the blade 12 extends substantially perpendicularly therefrom. The blade 12 carries a mirror 30 which may be deployed and pivoted relative to the blade 12, as will be described in detail hereinafter.

The blade 12 comprises a base plate 22 and a side flange or wall 24 extending substantially perpendicularly from the base plate 22. The blade 12 has a proximal end 13 at which, in use, the blade 12 is connected to the handle 14, and a distal end, or tip 18, which, in use, is inserted into a patient's mouth (not shown) and used in normal manner to facilitate visualization of the trachea or larynx. Preferably, the blade 12 is slightly curved in a manner similar to that of the Macintosh-type laryngoscope. At its proximal end 13, the blade 12 is provided with a mount 78 which permits the blade 12 to be releasably secured to the handle 14, by means of a corresponding interengagable coupling 70 located at the top of the handle 14. Preferably, a light source, conveniently in the form of a light bulb 36, is provided on the blade 12. Conveniently, the light 36 is mounted on the side wall 24 at a forward position on the blade 12, the light 36 being arranged, in use, to irradiate the region around the tip 18 of the blade 12. The handle

WO 03/041570

PCT/EP02/12619

9

14 is conveniently arranged to house batteries 90 in order to supply power to the light 36, although any other suitable power source may be employed. The configuration and operation of the light 36 will be described in greater detail hereinafter.

In the preferred embodiment, the tip 18 is pivotally mounted on the blade 12, conveniently via a link 20. As is best illustrated in Figures 4 and 5, the tip 18 is pivotable in the general direction of the handle 14 (as indicated by arrow A in Figure 5) in order to draw the epiglottis (not shown) away from the laryngeal inlet of the patient, so as to provide a clearer view of the patient's larynx. In order to effect this pivoting motion, the laryngoscope 10 is provided with an operating mechanism in the form of a lever 16 which is pivotally mounted on the blade 12. In the illustrated embodiment, and in particular from Figure 2, it can be seen that the lever 16 is mounted to the side wall 24 of the blade 12. To this end the lever 16 is connected to a bushing 66, which is seated on and is rotatable about a boss 68 which is provided on the blade 12. The bushing 66 is coupled to the boss 68 by a spring (not shown), the spring being biased to urge the bushing 66 to rotate in a clockwise direction (as viewed in Figure 2) about the boss 68. Thus, the bushing 66, the boss 68 and the spring together serve as a spring mechanism biased to urge the lever 16 away from the handle 14. Figure 1 shows that lever 16 in a rest state which it adopts under the action of the spring mechanism and in the absence of any external forces, such as a user's grip, being exerted.



WO 03/041570

PCT/EP02/12619

10

The bushing 66 is provided with a first lug 62, to which is pivotably mounted one end of a rigid strut or rod 60. The other end of the rod 60 is pivotably connected to the tip 18 of the blade 12. The arrangement is such that depression of the lever 16 towards the handle 14 (in the direction indicated by arrow B in Figure 5), causes the first lug 62 to move generally towards the tip 18 and this, in turn, actuates the rod 60 outwardly towards the tip 18. As the rod 60 is actuated outwardly, it causes the tip 18 to pivot with respect to the blade 12 in a direction generally towards the handle, i.e. clockwise as viewed in Figure 2. It will be understood that the amount by which the lever 16 is depressed determines that amount by which the tip 18 is pivoted. When the lever 16 is released it will, under the action of the spring mechanism, return to its rest state thereby drawing the tip 18 back into normal alignment with the blade 12 as is shown in Figure 1.

The mirror 30 may be actuated between a non-deployed state (as shown in Figure 1) and at least one deployed state. Figures 2 to 5 illustrate the mirror 30 in various states of deployment.

In the preferred embodiment, the non-deployed state corresponds with the lever 16 adopting its rest state, as shown in Figure 1. In this state, the mirror 30 rests against the base plate 22 of the blade 12, with the reflective surface of the mirror 30 facing towards the base plate 22. In this state, the overall size of the blade 12 (including the mirror 30) is minimized and this facilitates insertion of the blade 12 into a

WO 03/041570

PCT/EP02/12619

11

patient's mouth/throat (not shown). As can best be seen from Figure 1 and Figure 3, it is preferred that that at least the portion of the base plate 22 (including the tip 18) that receives the mirror 30 in the non-deployed state is at least as wide as the mirror 30 such that, when in the non-deployed state, the underside (i.e. reflective surface) of the mirror 30 is fully occluded by the base plate 22/tip 18. This helps to prevent the reflective surface of the mirror 30 from becoming smudged or otherwise obscured during insertion of the blade 12 into a patient's mouth. In addition, the mirror receiving portion of the tip 18 and the base plate 22 may be recessed by approximately the depth of the mirror 30 so that the mirror 30, when in the non-deployed state, sits within the recess (not shown) such that the exposed face of the mirror 30 lies flush with the base plate 22.

Once the blade 12 is inserted into a patient's mouth, it is necessary to deploy the mirror 30 in order to provide a clear view of the patient's larynx. To this end, the mirror 30 is carried by a deployment assembly which comprises a deploying arm 26 and a secondary arm 28. The deploying arm 26 is pivotably mounted on the blade 12. In the illustrated embodiment, the deploying arm 26 is pivotably mounted on the side wall 24 via a first pivot 50, and carries a spring 46 which is secured to the deploying arm 26 around an anchor 48. The secondary arm 28 is coupled to the deploying arm 26 by means of a main slot 42 in which there is located a main pin 44, and advantageously also a guide slot 52 in which there is located a guide pin 54. The arrangement is such that the deploying arm 26 and the secondary arm

WO 03/041570

PCT/EP02/12619

12

28 are capable of sliding movement relative to one another in a direction generally parallel with their longitudinal axes, the extent of the sliding movement being limited by the relative dimensions of the slots 42, 52 and pins 44, 54. In the illustrated embodiment, the main slot 42 and the guide slot 52 are formed in the deployment arm 26 while the main and guide pins 44, 54 are provided on the secondary arm 28. It will be understood however that in an alternative embodiment the slots/pins may be provided on either arm 26, 28.

The spring 46 engages with and acts upon the main pin 44 so as to urge the main pin 44 towards one end of the main slot 42. In the illustrated embodiment, the spring 46 urges the main pin 44 towards the mirror-end of the main slot 42, namely the end nearest the mirror 30. The arrangement is such that, when the mirror 30 is in the non-deployed state, the spring 46 holds the main pin 44 in a first position in the slot. Conveniently, in the first position, the main pin 44 is held in engagement with the mirror-end of the slot 42 as shown in Figure 1. Hence, the spring 46, the main slot 42 and the main pin 44 together form a spring assembly biased to maintain the deployment arm 24 and the secondary arm 26 in the first position. The guide pin 54 adopts a corresponding first position within the guide slot 52.

In order to actuate the deployment assembly, a second lug 64 is provided on the bushing 66, generally oppositely disposed on the bushing 66 with respect to the first lug 62. Thus, when the lever 16 is depressed towards the handle 14, the second lug 64 moves

WO 03/041570

PCT/EP02/12619

13

generally away from the tip 18 of the blade 18 (anti-clockwise as viewed in Figure 2). A tie 58, shown in the form of a second rigid rod, has one end pivotably connected to the second lug 64. The other end of the tie 58 is connected to the deployment assembly. In the preferred embodiment, the tie 58 is connected directly to the second arm 28 and an access slot 41 is formed in the side wall 24 of the blade 12 through which the tie 58 passes.

10

The arrangement is such that, initial depression of the lever 16 from its rest state draws the tie 58 rearwardly (i.e. away from the tip 18), thereby exerting a rearward force on the secondary arm 28. Initially, the spring 46 acts to prevent relative sliding movement between the secondary arm 28 and the deploying arm 26. Hence, the force applied to the secondary arm 28 by the tie 58 causes the deploying arm 26 (and therefore also the secondary arm 28) to pivot about the first pivot 50 (anti-clockwise as seen from Figure 2), thereby drawing the mirror 30 upwardly away from the base plate 22 into a deployed state. However, as can be seen from Figure 1, the deploying arm 26 is provided with a shoulder 34 which, after limited rotation of the deploying arm 26 about pivot 50, abuts against the base plate 22. At this point, the deploying arm 26 cannot rotate any further in the direction away from the blade 12. Thus, the force exerted on the secondary arm by further rearward movement of the tie 58, due to further depression of the lever 16, overcomes the force of the spring 46 which is no longer able to hold the main pin 44 in its first position. As can best be appreciated from

WO 03/041570

PCT/EP02/12619

14

Figure 4, the main pin 44 is thus drawn rearwardly within the main slot 42 (i.e. away from the mirror-end), against the action of the spring 46, resulting in relative sliding movement between the deploying arm 26 and the secondary arm 28. The laryngoscope 10 is arranged to translate this relative movement into pivoting movement of the mirror 30 relative to the deploying arm 26, as is described below.

10 The mirror 30 is pivotably mounted on the deployment assembly. To this end, the mirror 30 is fixed to a mounting bracket 32 which is pivotably mounted on the deploying arm 26 at a second pivot 55. The secondary arm 28 is pivotably connected to the mounting bracket 15 32 at a third pivot 56 which is eccentrically located relative to the second pivot 55, as may best be seen in Figures 4 and 5. The arrangement is such that, as the secondary arm 28 is drawn rearwardly (i.e. away from the mirror 30) with respect to the deploying arm 26, 20 the mounting bracket 32 will be caused to pivot about the second pivot 55 (in an anti-clockwise direction as viewed in Figures 4 and 5), thereby imparting a corresponding pivoting motion to the mirror 30 (as indicated by arrow C in Figure 5). It will be apparent 25 that the mounting bracket 32 could be formed integrally with the mirror 30, thereby obviating the need for the two components to be manufactured separately and subsequently secured together.

30 In Figure 3, the mirror 30 is shown in a deployed but non-pivoted position with respect to the deployment arm 26 and this corresponds to the situation where the main pin 44 (and therefore the guide pin 54) are held in the

WO 03/041570

PCT/EP02/12619

15

first position, i.e. no relative sliding movement of the deployment arm 26 and the secondary arm 28 has taken place. In Figure 4, the main pin 44 is shown drawn partially back along the length of the main slot 42, and thus the mirror 30 is pivoted, or angularly displaced, with respect to the deploying arm 26 by a corresponding amount. In Figure 5, the lever 16 has been sufficiently depressed that the main pin 44 is drawn fully back within the main slot 42, and thus the mirror 30 is in its fully pivoted, or most angularly displaced, state with respect to the deploying arm 26.

It will be appreciated that, depending on the amount by which the lever 16 is depressed, the mirror 30 may adopt a plurality of different deployed states and that, when deployed, the mirror 30 may further adopt a plurality of different pivoted states with respect to the deployment arm 26. Hence, during use, a user is able to adjust the position and orientation of the mirror 30 until an optimal view of the larynx is obtained.

It will be apparent that, as both the lever 16 and the main pin 44 are spring biased, release of the lever 16 will result in the mirror 30 returning to its non-pivoted state, and subsequently in pivoting of the deploying arm 26 and the secondary arm 28 back towards the base plate 22, so as to return the mirror 30 to its non-deployed state.

30

The base plate 22 is provided with a recess 57 arranged to house the mounting bracket 32 when the mirror 30 is in the non-deployed state. Although a suitably shaped

WO 03/041570.

PCT/EP02/12619

16

aperture (not shown) could have alternatively been provided in the base plate 22 for receiving the mounting bracket 32, the recess 57 ensures that, during insertion of the blade 12 into a patient's mouth, the mirror 30 is not contacted by saliva or the like, which may subsequently impair the view provided by the mirror 30. Further, by surrounding the mounting bracket 32 the recess 57 protects the patient's mouth and tongue from damage which may otherwise be caused during insertion of the blade 12.

In addition, the side wall 24 may be laterally recessed along at least part of the length thereof adjacent the deploying arm 26 and the secondary arm 28, such that the outwardly facing surface of the deploying arm 26 lies substantially flush with the remainder of the side wall 24. It will be appreciated that such an arrangement would provide a clearer view, in use, down the length of the blade 12.

The light 36 is arranged to irradiate the mirror 30 when deployed. The light 36 may be of any suitable form, for example an LED, a tungsten filament bulb, or a fibre optic bundle. In order to supply the light 36 with power, a conduit 40 is connected to the light 36, and extends rearwardly to the coupling 70, as can be seen in Figure 2 and Figure 7. The coupling 70, during use, is electrically connected to the handle 14 so as to enable the passage of current from the batteries 90 in the handle 14 to the conduit 40, a preferred arrangement for which is described below.

WO 03/041570

PCT/EP02/12619

17

The batteries 90 are inserted, by removal of a cap 88, into the handle 14. The coupling 70 at the top of the handle 14, as shown in Figure 6, includes a first contact 86 projecting therefrom. When the mount 78 is secured to the coupling 70, the first contact 86 abuts a second contact 76, which is electrically connected to the conduit 40. In order to releasably secure the blade 12 to the handle 14, the coupling 70 includes a mouth 72 which engages a bar 80 of the mount 78. The coupling 70 further includes a number of conventional detent balls 74 which engage corresponding indents 84 in a pair of walls 82 of the mount 78. The coupling 70 may thus be clipped and unclipped to the mount 78, thereby supplying power to the light 36 when the handle 14 is secured to the blade 12.

With the laryngoscope 10, the deployment of the mirror 30, the pivoting of the mirror 30 and the pivoting of the tip 18 can all be performed by operation of a single lever 16. Deployment of the mirror 30 occurs simultaneously with pivoting of the tip 18 as the lever 16 undergoes initial depression from its rest state. In the preferred embodiment, the arrangement is such that the lever 16 continues to cause the tip 18 to pivot as the lever 16 is further depressed, i.e. the tip 18 pivots simultaneously with the pivoting of the mirror 30. It is found that during said further depression of the lever 16 the user can fine tune the orientation of the mirror 30 and tip 18 so as to optimize his view of the trachea/larynx. Hence, the user has full operational control over the laryngoscope 10 using only one lever 16. The laryngoscope 10 may therefore readily be operated using only one hand.



WO 03/041570

PCT/EP02/12619

18

Moreover, the lever 16 may be operated by exerting a simple squeezing action on the lever 16 and does not require any dextrous finger movements.

- 5 Further, the provision of a deployable and adjustable mirror allows the larynx to be visualized in difficult intubations without the need to use fiberoptic equipment (which are expensive and require considerable user training).

10

- In alternative embodiments (not shown), the lever 16 may be replaced with any other suitable operating mechanism. For example, a cable system may be used wherein one or more cables are connected to the  
15 deployment assembly and, when used, the pivotable blade tip, for the actuation thereof. An operating knob may be provided on the cable to allow a user to push or pull the cable(s) back and forth thereby operating the mirror and tip in a similar manner to that described  
20 above.

- The foregoing description is of a preferred embodiment of the invention and a skilled person will readily understand that many of the specific component parts  
25 described above may be replaced with technically equivalent parts while achieving the same technical effect. The present invention is therefore not limited to the embodiment described herein, which may be amended or modified without departing from the scope of  
30 the present invention.

WO 03/041570

PCT/EP02/12619

19

## CLAIMS:

1. A laryngoscope comprising a laryngoscope blade; a deployable mirror; and an operating mechanism, the  
5 operating mechanism being operatively associated with the mirror for the deployment thereof, wherein the mirror is pivotable with respect to the blade, the association of the operating mechanism and the mirror being such that an initial operation of the operating  
10 mechanism causes the mirror to be deployed, and further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade.
2. A laryngoscope as claimed in Claim 1, wherein the  
15 mirror is pivotably mounted on a deployment assembly, the deployment assembly being pivotably mounted on the blade, the arrangement being such that said initial operation of the operating mechanism causes the deployment assembly to be pivoted with respect to the  
20 blade, and said further operation of the operating mechanism causes the mirror to be pivoted with respect to the deployment assembly.
3. A laryngoscope as claimed in Claim 2, wherein the  
25 deployment assembly comprises a deployment arm coupled to a secondary arm so as to permit relative movement between the deployment arm and secondary arm, the mirror being coupled to both the deployment arm and the secondary arm so that relative movement thereof causes  
30 the mirror to pivot.
4. A laryngoscope as claimed in Claim 3, wherein the coupling of the deployment arm and the secondary arm

WO 03/041570

PCT/EP02/12619

20

includes a spring assembly biased to maintain the deployment arm and the secondary arm in a first position relative to one another, the arrangement being such that, during said initial operation of the operating mechanism, the spring assembly maintains the deployment arm and the secondary arm in the first position, and that, during said further operation of the operating mechanism, a portion of the deployment arm abuts against the blade so that the action of the operating mechanism on the deployment assembly overcomes the bias of the spring mechanism to cause relative movement of the deployment arm and the secondary arm.

5. A laryngoscope as claimed in Claim 4, wherein said spring assembly comprises a pin slidably located within a slot, and a spring arranged to act on the pin to maintain the pin in the first position within the slot.

6. A laryngoscope as claimed in Claim 5, wherein the slot is formed in the deployment arm and the pin is provided on the secondary arm.

7. A laryngoscope as claimed in any preceding claim, wherein the operating mechanism comprises a lever, the lever being pivotable with respect to the blade.

8. A laryngoscope as claimed in Claim 7, wherein the lever is connected to the secondary arm by a tie.

9. A laryngoscope as claimed in any of claims 3 to 8, wherein the mirror is provided with a mounting bracket, the mounting bracket being pivotably mounted on the

WO 03/041570

PCT/EP02/12619

21

deployment arm, the secondary arm being pivotably connected to the mounting bracket eccentrically of the connection between the mounting bracket and the deployment arm.

5

10. A laryngoscope as claimed in any preceding claim, wherein the blade is curved.

10 11. A laryngoscope as claimed in any preceding claim, wherein the blade extends, during use, substantially perpendicularly from a handle.

12. A laryngoscope as claimed in Claim 11, wherein the blade is detachably mountable on the handle.

15

13. A laryngoscope as claimed in Claim 11 or 12 when dependent on any of claims 7 to 9, wherein the lever is spring biased in a direction generally away from the handle and wherein said initial and further operation  
20 of the lever involve movement of the lever in a direction generally towards the handle.

14. A laryngoscope as claimed in any preceding claim, wherein the mirror is actuatable between a non-deployed  
25 state, in which the mirror is located against or adjacent the blade, and at least one deployed state in which the mirror is spaced-apart from the blade with its reflective surface facing generally towards the blade.

30

15. A laryngoscope as claimed in Claim 14 when dependent on Claim 13, wherein the lever is arranged to adopt a rest state in the absence of external forces,

WO 03/041570

PCT/EP02/12619

22

in which rest state the lever is spaced-apart from the handle, the arrangement being such that, when the lever adopts the rest state, the mirror adopts the non-deployed state, initial movement of the lever from the rest state towards the handle causing the mirror to be deployed, and further movement of the lever towards the handle causes the mirror to be pivoted.

16. A laryngoscope as claimed in Claim 14 or 15, wherein a recess is formed in the blade for receiving the mirror when in the non-deployed state.

17. A laryngoscope as claimed in any preceding claim, wherein the blade comprises a pivotable tip, the operating mechanism being operatively associated with the tip to cause the tip to pivot with respect to the blade.

18. A laryngoscope as claimed in Claim 17, wherein the operating mechanism is arranged to cause the tip to pivot during said initial operation.

19. A laryngoscope as claimed in Claim 17 or 18, wherein the operating mechanism is arranged to cause the tip to pivot during said further operation.

20. A laryngoscope as claimed in any of Claims 17 to 19 when dependent on Claim 11, wherein during said initial or further operation of the operating mechanism, the tip is caused to pivot in a direction generally towards the handle.

WO 03/041570

PCT/EP02/12619

23

21. A laryngoscope as claimed in any preceding claim, wherein the blade carries a light source arranged to irradiate the mirror when deployed.

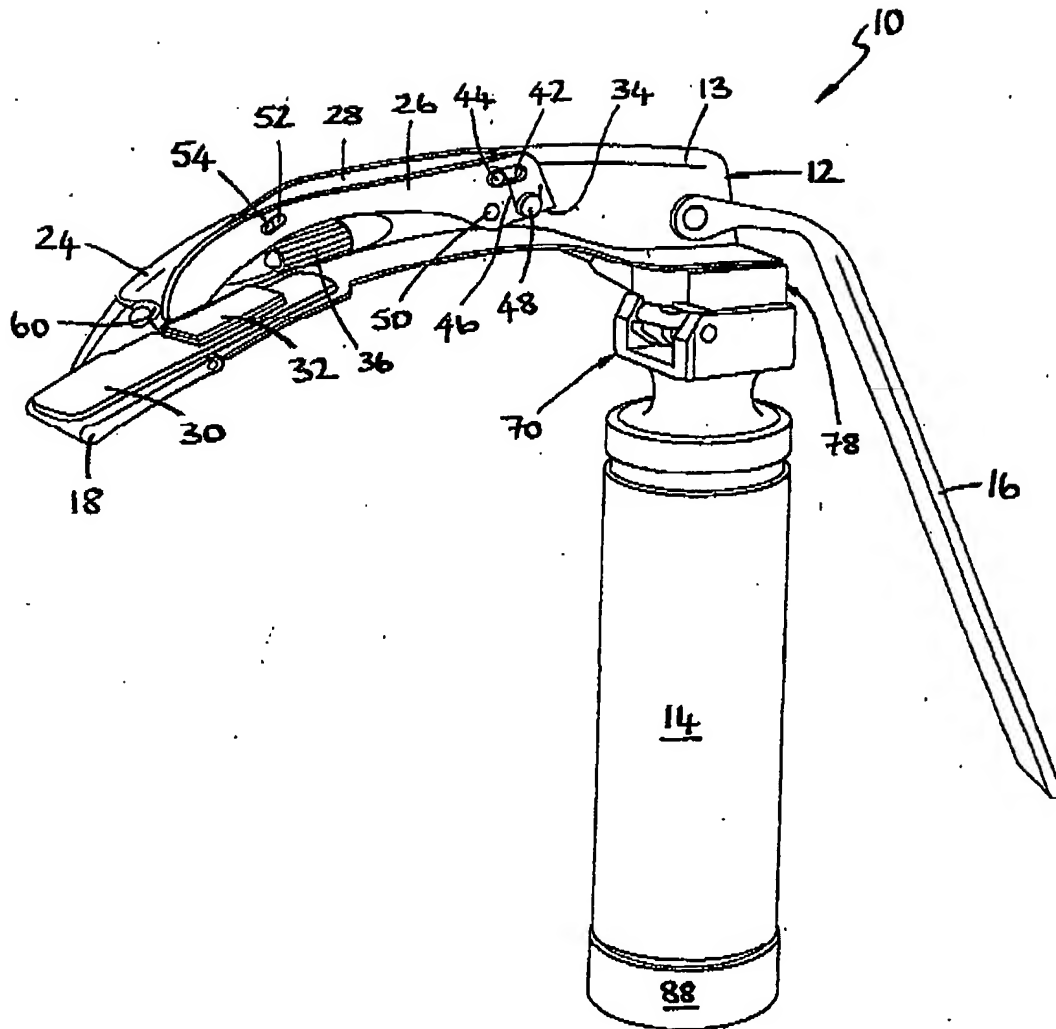
- 5 22. A blade for a laryngoscope, the blade comprising a deployable mirror; and an operating mechanism, the operating mechanism being operatively associated with the mirror for the deployment thereof, wherein the mirror is pivotable with respect to the blade, the
- 10 association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism causes the mirror to be deployed, and further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade.

DEC-03-04 14:01 From:

WO 03/041570

1/5

PCT/EP02/12619

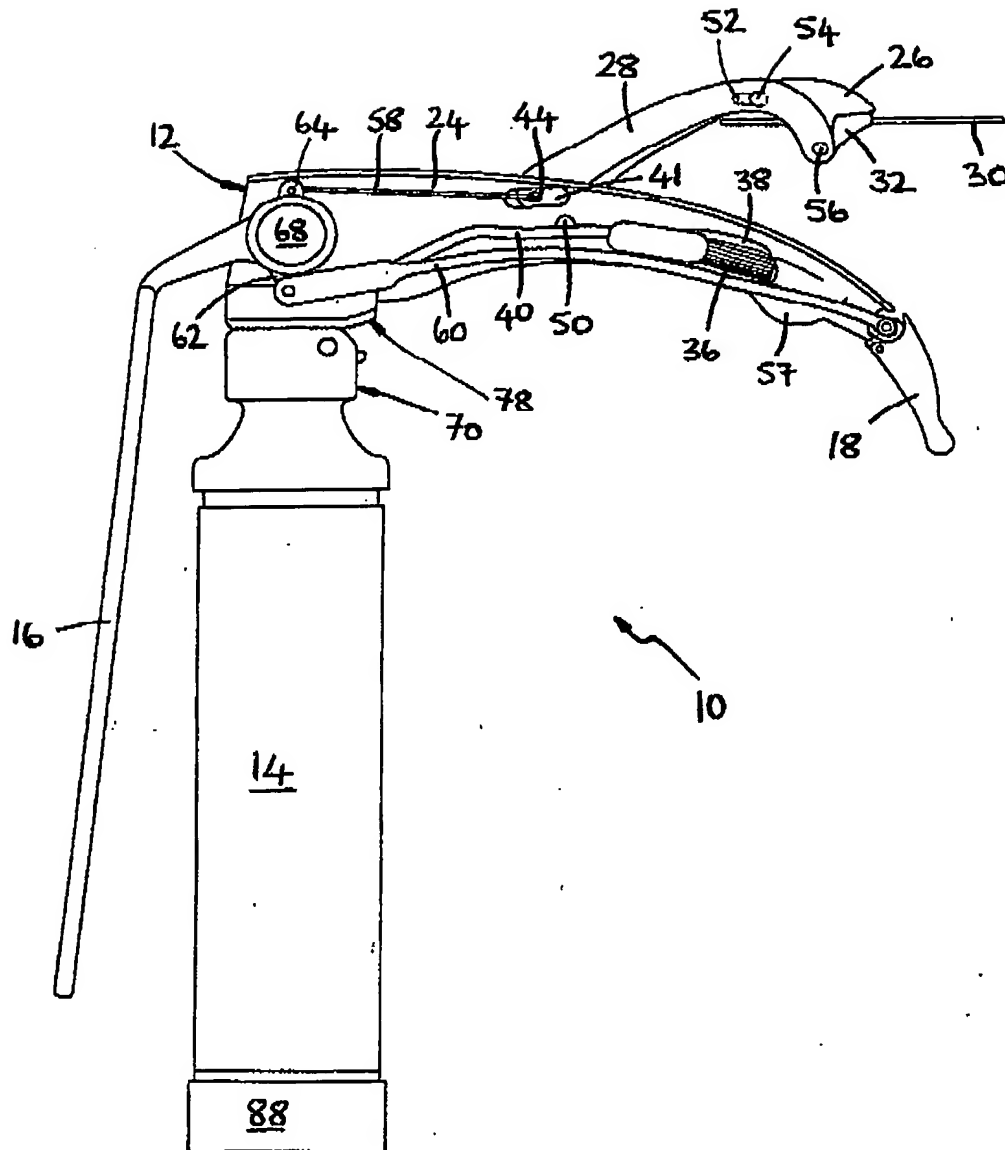
Fig. 1

DEC-03-04 14:02 From:

WO 03/041570

2/5

PCT/EP02/12619

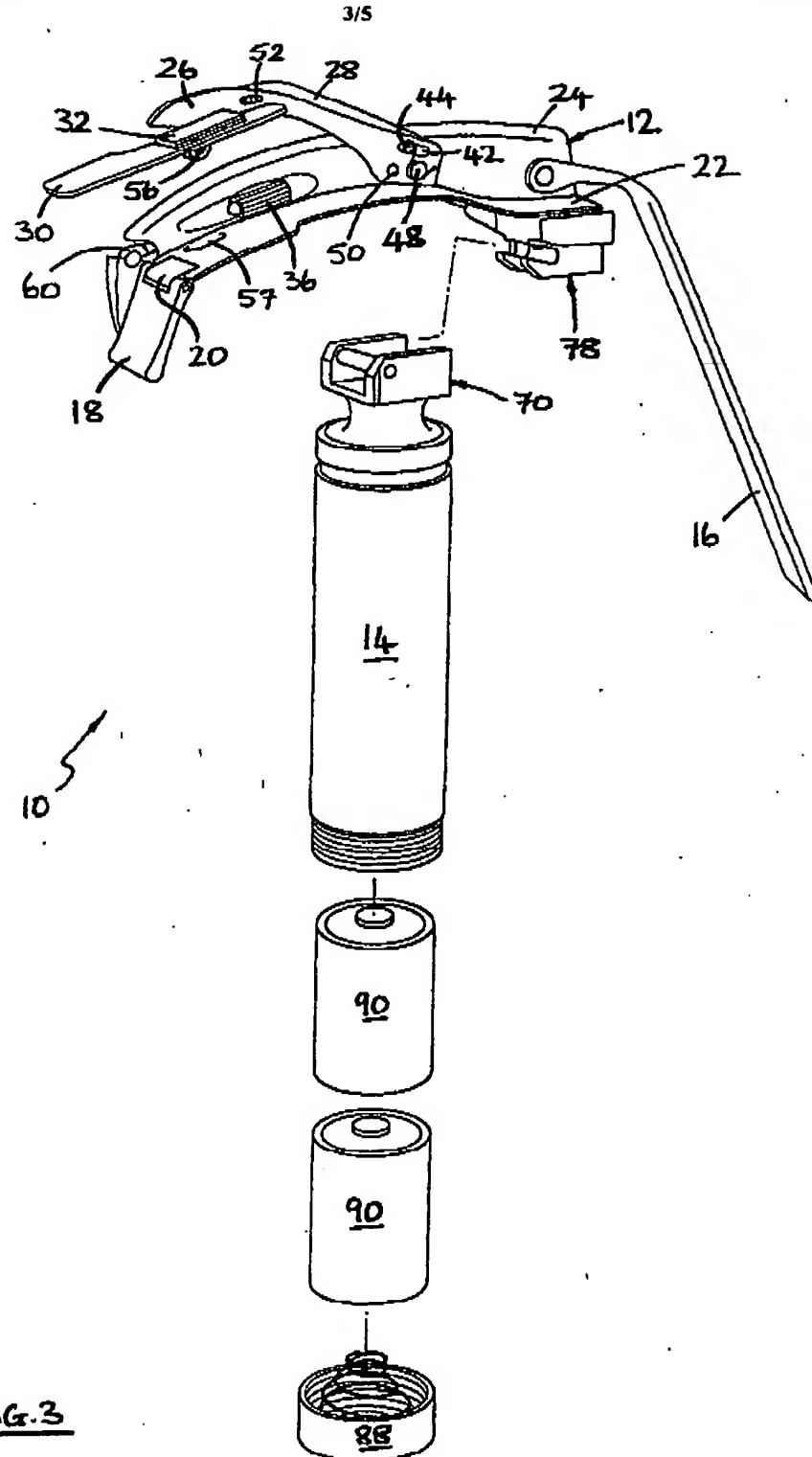
FIG. 2



DEC-03-04 14:02 From:

WO 03/041570

PCT/EP02/12619



WO 03/041570

4/5

PCT/EP02/12619

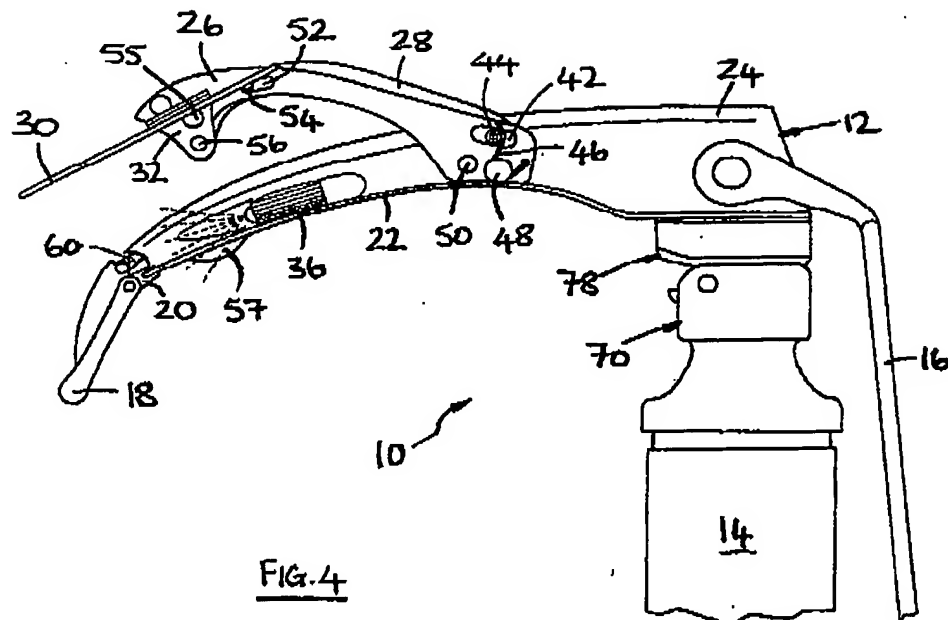


FIG. 4

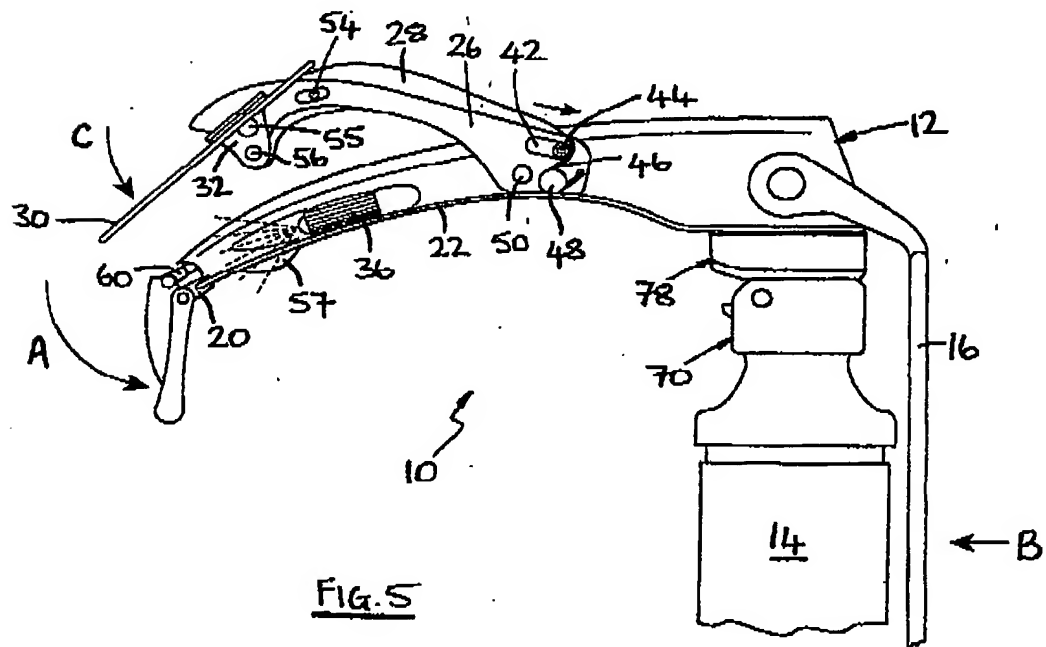


FIG. 5

DEC-03-04 14:02 From: 1005 YAN C

WO 03/041570

5/5

PCT/EP02/12619

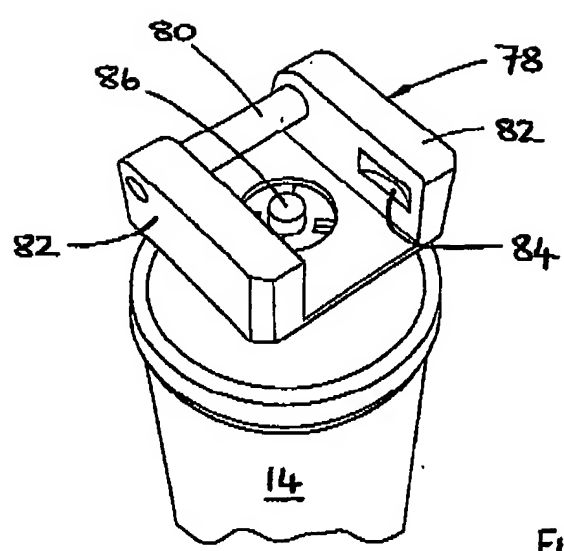


Fig. 6

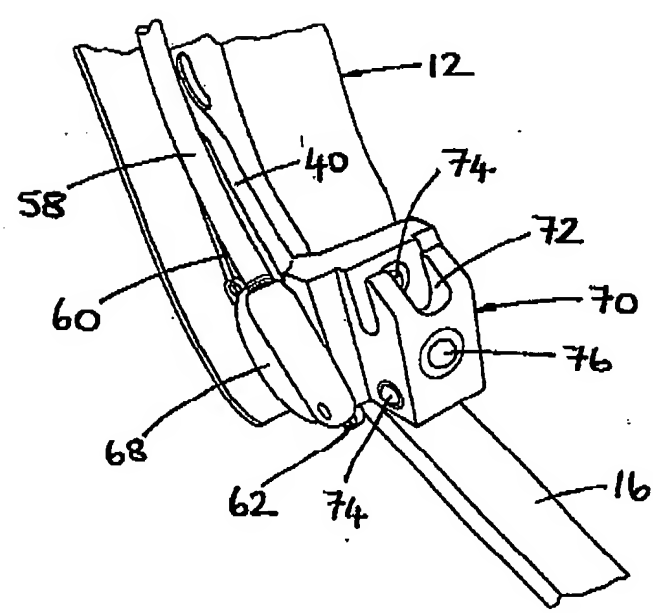


Fig. 7

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
22 May 2003 (22.05.2003)

PCT

(10) International Publication Number  
**WO 03/041570 A3**(51) International Patent Classification: **A61B 1/267**

(21) International Application Number: PCT/EP02/12619

(22) International Filing Date:  
12 November 2002 (12.11.2002)

(25) Filing Language: English

(26) Publication Language: English

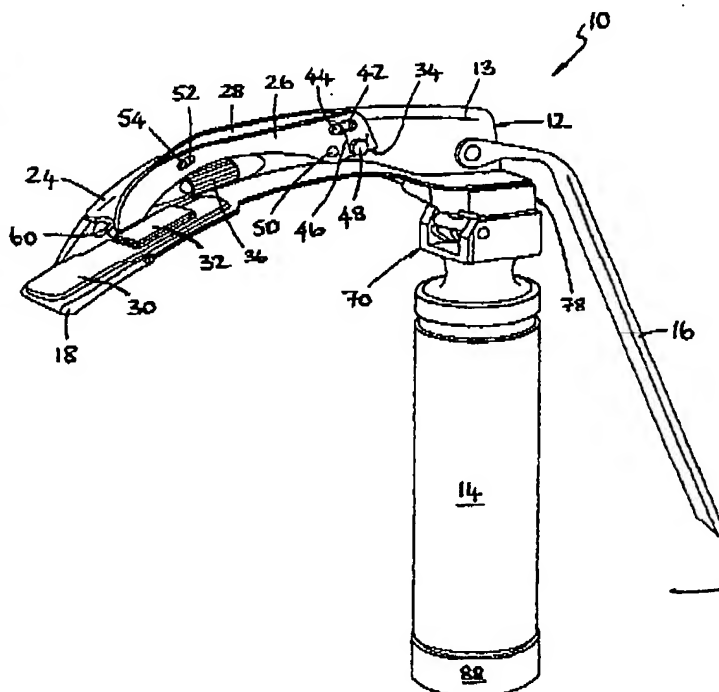
(30) Priority Data:  
0127130.3 13 November 2001 (13.11.2001) GB

(71) Applicant and

(72) Inventor: McMorrow, Roger [GB/GB]; 148 Finaghy  
Road South, Belfast BT10 0DG (GB).(74) Agents: WALLACE, Alan et al.; F R Kelly & Co, 9 Uni-  
versity Street, Belfast BT7 1FY (GB).(81) Designated States (national): AB, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GH, GM,  
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VN, YU, ZA, ZM, ZW.(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK,  
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).Published:  
— with international search report(88) Date of publication of the international search report:  
23 October 2003

[Continued on next page]

(54) Title: A LARYNGOSCOPE



(57) Abstract: One aspect of the present invention provides a laryngoscope comprising a blade (12); a deployable mirror; and an operating mechanism, the operating mechanism being arranged to deploy the mirror (30). The mirror is pivotable with respect to the blade and the arrangement is such that an initial operation of the operating mechanism causes the mirror to be deployed while further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade. In the preferred embodiment, the blade has a pivotable tip (18) which is also operable by the operating mechanism. The deployment of the mirror, the pivoting of the mirror (30) and the pivoting of the tip (18) can all be performed by operation of a single operating mechanism, preferably in the form of a simple lever. The laryngoscope may therefore readily be operated using only one hand and without the need for any dextrous finger movements.

WO 03/041570 A3

## INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No  
PCT/EP 02/12619

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6135948	A	24-10-2000	WO AU	0215772 A1 6922300 A
GB 2258398	A	10-02-1993	NONE	
US 4360008	A	23-11-1982	CA	1165651 A1

Form PCT/ISA/210 (patent family annex) (July 1992)



## INTERNATIONAL SEARCH REPORT

Internat Application No  
PCT/kr 02/12619


<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 A61B1/267		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 135 948 A (LEE HAN SHIK) 24 October 2000 (2000-10-24)  column 3, line 46-50 column 4, line 26 -column 5, line 23 column 5, line 50-62; figures 5,7-9,14-16	1-3,7,8, 10-12, 14,21,22
Y		13,15
Y	GB 2 258 398 A (MACDONALD STUART DONALD) 10 February 1993 (1993-02-10) page 2, line 1-36; figures 1,2	13,15
A	US 4 360 008 A (CORAZZELLI JR FRANK G) 23 November 1982 (1982-11-23) column 2, line 46-61 column 3, line 45-62 column 5, line 38-62 column 6, line 15-22; figures 1,4	17-20
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents: *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *B* document member of the same patent family		
Date of the actual completion of the international search  16 July 2003		Date of mailing of the international search report  24/07/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3018		Authorized officer  Pohjamo, T

Form PCT/ISA/210 (second sheet) (July 1992)

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicants or agent's file reference <b>P62359MCO0MCO0</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. <b>PCT/EP 02/12619</b>	International filing date (day/month/year) <b>12.11.2002</b>	Priority date (day/month/year) <b>13.11.2001</b>
International Patent Classification (IPC) or both national classification and IPC <b>A61B1/267</b>		
Applicant <b>MCMORROW, Roger</b>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 5 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the opinion</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>		
Date of submission of the demand  <b>04.06.2003</b>	Date of completion of this report  <b>02.04.2004</b>	
Name and mailing address of the international preliminary examining authority:  European Patent Office - Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized Officer  <b>Pohjamo, T</b>  Telephone No. +49 30 25901-677	





**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**International application No. **PCT/EP 02/12619****I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-18 as originally filed

**Claims, Numbers**2-22 as originally filed  
1 received on 23.02.2004 with letter of 23.02.2004**Drawings, Sheets**

15-55 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☒ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**International application No. **PCT/EP 02/2619**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).  
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	22
Inventive step (IS)	Yes: Claims	1-21
	No: Claims	22
Industrial applicability (IA)	Yes: Claims	1-22
	No: Claims	

2. Citations and explanations

see separate sheet

Form PCT/PEA/409 (January 2004)

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP02/12619

**Re Item V****Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Reference is made to the following documents:**

D1: US-A-6 135 948 (LEE HAN SHIK) 24 October 2000 (2000-10-24)  
D2: GB-A-2 258 398 (MACDONALD STUART DONALD) 10 February 1993  
(1993-02-10)

**2. Novelty (Article 33(2) PCT)**

Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parentheses applying to this document): a blade (14) for a laryngoscope, the blade comprising a deployable mirror (20); and an operating mechanism (32, 44, 48-52, 58), the operating mechanism being operatively associated with the mirror for the deployment thereof, wherein the mirror is pivotable with respect to the blade (Fig. 9), the association of the operating mechanism and the mirror being such that an initial operation of the operating mechanism causes the mirror to be deployed (Fig. 7), and further operation of the operating mechanism causes the mirror to be pivoted with respect to the blade (Fig. 9).

The subject-matter of claim 22 is therefore not new (Article 33(2) PCT).

**3. Inventive Step (Article 33 (3) PCT)**

Document D1 discloses a laryngoscope with a deployable and pivotable mirror from which the subject-matter of claim 1 differs in that the operating mechanism is spring biased to adopt a rest state, and that the deploying and pivoting of the mirror are done by operating the operating mechanism from its rest state against the spring bias. An initial operation causes the deploying, and a further operation the pivoting.

Document D2 discloses a laryngoscope with a deployable mirror, where the

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP02/12619

operating mechanism is spring biased to adopt a rest state (p. 2 lines 31-36). However, there is no pivoting of the mirror. In D1 the operating of the mirror is done in two phases: first deploying the mirror by pressing the operating mechanism towards the body of the laryngoscope (col. 5 lines 56-58), and then pivoting the mirror by sliding the operating mechanism (col. 5 lines 58-60). Pressing and sliding are separate operations, therefore differing from the continuous and combined operation mechanism of claim 1. Also nothing in D1 suggests that the operating mechanism would automatically be returned to a rest position when not operated. Therefore, not even the combination of D1 and D2 would lead a skilled person to the laryngoscope of claim 1. The subject-matter of claim 1 involves an inventive step as required by Article 33(3) PCT.

4. The industrial applicability (Article 33(4) PCT) is clearly given for the subject-matter of claims 1-22.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**